

EXP. NO: 2 DETERMINATION OF CURRENT IN CIRCUIT

DATE: USING MESH ANALYSIS

AIM:

To determine the current in circuit using mesh analysis both theoretically and practically for a given DC circuit.

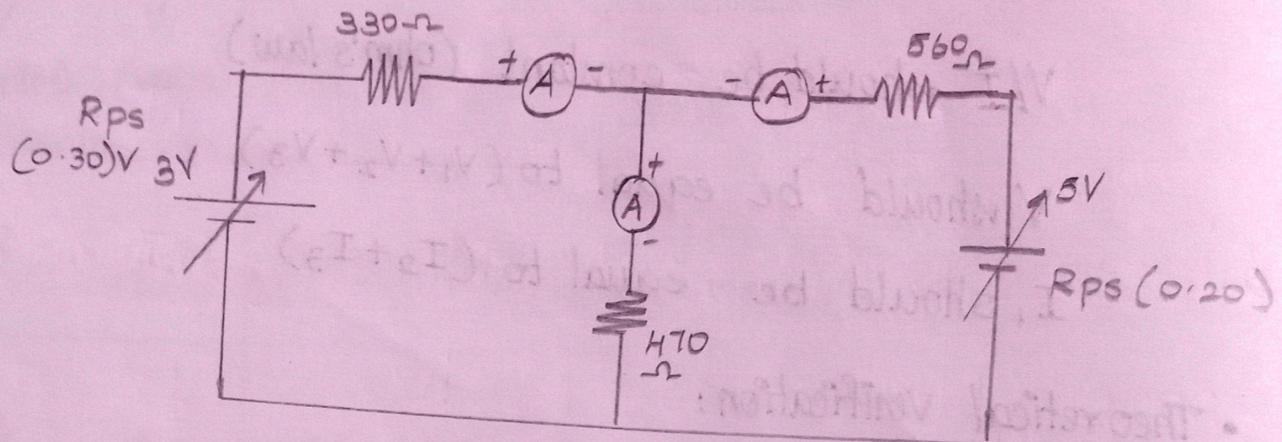
APPARATUS REQUIRED:

SL. NO	APPARATUS	SPECIFICATION	QUANTITY
1	Regulated Power Supply (RPS)	(0-30V)	1
2	Ammeter	(0-10mA) MC	3
3	Resistors	330Ω , 470Ω , 560Ω	Each 1
4	Bread board	-	1

PROCEDURE :

1. Give Connections as per the circuit diagram
2. Switch ON the supply, vary the RPS (Regulated Power supply) and set a particular input voltage.
3. Note down the readings of ammeters and voltmeters and tabulate them.
4. Vary the RPS for different input voltages and note down the readings of all the meters.
5. Reduce the RPS to its minimum value and switch OFF the supply.
6. Using the tabulated values, verify Kirchoff's Laws practically, and verify it theoretically.

CIRCUIT DIAGRAM:



Mesh circuit

TABULAR COLUMN:

Parameters	Theoretical	Practical
I_1	0.0090 A	0.089 A
I_2	0.0089 A	0.076 A
$I_1 - I_2$	0.0012 A	0.0012 A

Loop I

$$-50 + 330I_1 + 470(I_1 - I_2) = 0$$

$$800I_1 - 470I_2 = 30 \rightarrow ①$$

Loop II

$$-20 + 560I_2 + 470(I_2 - I_1) = 0$$

$$-470I_1 + 1050I_2 = 50$$

$$10^3 \times ① \Rightarrow 82400I_1 - 48410I_1 = 309$$

$$47 \times ① \Rightarrow -22090I_1 - 4840I_2 = 255785$$

$$60310I_1 = 544$$

$$I_1 = \frac{544}{60310} = 0.0090 \Omega = 9.02 \text{ mA}$$

sub can I_1 in eqn ①

$$800(0.009) - 470I_2 = 30$$

$$0.72 - 470I_2 = 30$$

$$I_2 = 4.2$$

$$I_2 = \frac{4.2}{470} = 0.00897 = 8.97 \text{ mA}$$

$$I_1 - I_2 = 9.02 \text{ mA} - 8.97 \text{ mA} \\ = 0.05 \text{ mA}$$

CALCULATIONS:

Result:

Thus the mesh analysis is verified practically and theoretically the resistant current for 5V 3V supply are,

- The current across 330Ω resistor is 0.0090
- The current across 560Ω resistor is 0.0089
- The current across 470Ω resistor is 0.00012